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covered to a depth of six feet with dead fish and other marine organisms, whose destruction was brought about by the lateral shifting of ocean currents from different sources and of very different temperatures. In all regions of the ocean where similar phenomena take place large deposits of phosphate of lime and glauconite are now in process of formation.

The most striking feature of the deeper marine deposits of the North Atlantic is the large number of calcareous shells which they contain. It is now definitely ascertained that the vast majority in bulk of these calcareous shells belong to animals and calcareous algæ which live in the surface waters of the ocean. These organisms are much more abundant in the warm, salt, tropical waters than in the colder, less salt waters towards the poles and along the continents where rivers pour their fresh waters into the ocean. On the other hand, pelagic organisms which secrete silica for their shells, skeletons, and frustules are more abundant in the colder and less salt water towards the poles and off the mouths of great rivers, where the oceanic water is diluted by water from the land.

The remains of silicious organisms are not sufficiently abundant on any part of the sea-floor of the North Atlantic to form deposits to which the names of Radiolarian ooze and Diatom ooze have been applied. This probably arises from the large amount of detrital matter carried into the North Atlantic on the one hand, and on the other to the large amount of very warm and salt water in all the central parts of the basin.

Until the present time it has been impossible to form even the vaguest estimate as to the rate of the deposition of Globigerina ooze on the floor of the North Atlantic. It is now recognized, however, that a submarine cable is preserved when in contact with this deposit; and the condition of a cable that was lifted by the *Faraday* in 1903 in 2,300 fathoms makes it perhaps fair to assume a period of ten years for the accumulation of a layer of the deposit one inch in thickness at the place where this cable was lifted.

The area of the floor of the North Atlantic between the parallels of 30° and 60° N. Lat. covered by Globigerina ooze is believed to be 60.94 per cent. of the total area; blue mud, 26.76; red clay, 10.80; or a total area for these three deposits of no less than 98.50 per cent. of the area indicated. This leaves an area of only 1.50 per cent. of the total area for the remaining four types represented—viz., green mud, volcanic mud, pteropod ooze, and coral mud. The principal deposit type is Globigerina ooze.

MARINE FOSSILS NEAR THE SOUTHERN EDGE OF THE SAHARA.

Professor de Lapparent's notes on the finding by the French of marine fossils in the Sahara have been referred to in an earlier number of the BULLETIN. The British members of the Anglo-French Commission which in 1903 delimited the boundary of the French and British possessions between the Niger and Lake Chad also

brought home a considerable number of fossils that were studied at the British Museum by Dr. Bather and Mr. Bullen Newton, who came to the same conclusion that the French scientists had reached. Dr. Bather said of these fossils at a meeting of the Royal Geographical Society on June 27 (*Geog. Jour.*, Nov., 1904):

The fossils are shells and sea-urchins for the most part, and the important point about them is that they denote the existence of a rock of Eocene Age, which had not previously been found in that district. Rocks of similar age occur along the northern part of Africa towards Tripoli and Tunis. They are also known to pass through Arabia, and down towards Somaliland, but in the district south of Algeria no rocks of this age had been previously known to exist. It is true that some years ago Rohlf's mentioned that he had seen ammonites in the neighbourhood of Bilma, which is a little north-west of Chad, and Cretaceous rocks were found there by the officers of the French expedition, and also by Colonel Monteil. The existence of Eocene rocks is a point of importance, not merely as showing an extension of the sea over the southern part of the Sahara in those times, but as affording some confirmation of the views of Suess, who has supposed that, while the lower triangle of Africa was raised out of the sea at a very early geological age, all this Saharan part of Africa, together with the present Mediterranean, Arabia, and the North-West Provinces of India, formed one great Mediterranean Sea. We have here proof for the first time that this sea actually did exist down to Sokoto, or at all events a little to the north of Sokoto, forming the southern limit of the present Sahara. And what is an interesting point in these fossils, and still further confirmation of these views, is that some of the fossils that have been found are of a distinctly Indian character. One of the sea-urchins is of a kind which has hitherto only been described from Sindh. It is very interesting to learn . . . that a species of the same genus has recently been found in Egypt.

We have, therefore, some evidence—pretty good as these things go—for a definite connection through Egypt and Arabia with the North-West Provinces of India. The Cretaceous rocks which have been proved by the existence of fossils have been proved to come down from the south towards Bilma, north of Lake Chad. . . .

One of the fossils found by Colonel Monteil lay around for a long time, till Professor A. de Lapparent saw it, and recognizing its importance, had it described by a specialist in paleontology, who discovered that it was the same thing as a kind of sea-urchin which was found quite recently in Beluchistan, in fossils of Cretaceous Age there. Here we have a proof of the connection of India and the Sahara in Cretaceous as well as in the later Tertiary times.

SEMI-CENTENNIAL OF THE AMERICAN GEOGRAPHICAL SOCIETY.

The fiftieth anniversary of the incorporation of the American Geographical Society was commemorated by a dinner at Delmonico's restaurant on the 21st of December, 1904.

One hundred and fifty Fellows and their guests were present.

During the dinner views of a geographical nature were exhibited on the screen.

After dinner toasts were drunk to the President of the United States and the American Geographical Society.

Letters and telegrams of congratulation were read from the officers of the Geographical Societies of Paris, Berlin, Geneva, Vienna, Antwerp, Rome, Budapest, London, and other cities of Europe and America.